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is probably about one hundred days. At the present writing I have alcoholic specimens of the young of this species that were given birth to in my presence by a specimen of *P. douglassii*, kept by me in captivity in New Mexico in 1885.

R. W. SHUFELDT.

MAY 27, 1896.

BOWS AND ARROWS OF CENTRAL BRAZIL.

EDITOR OF SCIENCE: I have just finished reading Dr. Hermann Meyer's 'Bogen und Pfeil in Central Brasilien' (Leipzig, 53 pp., 4 pl. of 67 figs., map), and find it good for sore eyes. His purpose to prepare a much larger work is declared at the outset, and his confession that the shortcomings and sins of collectors and labelers are at the bottom of the ethnographer's disappointments and errors will find an echo in many hearts. Indeed, Dr. Meyer has actually gone to the Mato Grosso to ascertain whether these things that were on his labels are really so.

All bows in South America are self bows. There is not now, and does not seem ever to have been, a made-up bow south of the Caribbean Sea. For the most part, these southern bows are very large, only in Guiana and the northwestern lands, as well as in the far south, in the Gran Chaco, on the Pampas and in Tierra del Fuego, are smaller forms in use. Quite contrary to Ratzel's observations on Africa, the powerful bows are to be found in forest regions, while the smaller ones are in the open.

In the central region studied by Meyer there are five types of bow, to wit:

1. The Peruvian, with rectangular long elliptical cross-section. The material is the heavy, black Chonta palm wood.

2. The North Brazilian, with semi-circular cross-section and made of a reddish brown leguminous wood.

3. The small Guiana bow, with parabolic cross-section, and often with a channel down the back. They are made of a dark brown wood. There are intermediate forms between 2 and 3.

4. The small Chaco bow, with circular cross-section and beautifully smoothed. Made from the red wood of the Curepay acacia.

5. East Brazilian bows of a variety of woods. There are two varieties, the eastern and the

western; the northern, or Shingu, and the southern, or Kameh, form connecting links between them. The western variety has circular cross-section, is made of strong wood and wrapped with 'Cipo' a Liana bast, used by the Bororo (Tupi). The eastern variety is of black Airi palm wood, in use among the Puri (Tapuya, or Gêz) and Botocudo (Tapuya, or Gêz).

Of arrows, Meyer characterizes six types, all having two feathers instead of three. In North America the Eskimo and several west coast tribes employed two feathers laid on flat, one above, one below. All the interior and eastern tribes seem to have had the rounded or cylindrical nock and three radiating arrows. The South American types are:

1. The East Brazilian or Gêz, Tupi feathering, occupying all east Brazil to the Paraguay and the Shingu. Two, whole, or seldom halved, feathers are laid on to the shaft flat, one above, one below, and seized with thread, filament or Cipo bast. These wrappings are frequently done in beautiful patterns and pretty tufts of feathers are inserted.

2. Guiana feathering, delicate and carefully laid on. Two short, half feathers are laid on and held fast by wrappings of threads here and there. Once in a while a North American arrow has the feathers thus made fast.

A bit of wood is inserted at the butt end for a nock piece.

3. The Shingu sewed feathering. Two half feathers are sewed on to the shaftment through little holes bored through on either side.

4. Arara feathering, two long half feathers held on by narrow bands of thread wrapping. At the butt end the wrapping is in beautiful patterns.

5. Mauhé feathering, like the East Brazilian, two whole feathers are bound on above and below. A neck piece is inserted at the butt end.

6. The Peruvian cemented feathering. The half feathers are first laid on and held in place by a coil of thread or bast from end to end and then covered with some sort of dark cement. This is subdivided into minor groups.

The shaft, the fore shaft, the barbs, the points of bamboo blades, of monkey bones or of wood, all receive minute attention. The most

of the treatise is devoted to the tracing of tribes (Stämme) by means of their bows and arrows.

Meyer's map will be a revelation to any student of South American ethnology. Brinton has traced the Arawak from the Paraguay river to the Bahama Islands. Long ago I was struck with South American characteristics upon wood carvings from Turk's Island and among tribes of the Southern States. Holmes draws attention to peculiar pottery marks from the South in the Gulf States, and Meyer shows that the region of the Matto Grosso northward was a *cloaca gentium*, especially the common sources of the Paraguay, the Shingu and the Tapajos and the lower courses of the Tapajos, the Madeira and the Negro. The Negro is joined to the Orinoco by the Cassiquiare, and from the mouth of the Orinoco to Florida is an unbroken chain of inviting islands. Dr. Brinton denies that the Carib stock passed far north into the Antilles, but there seems to have been an easy and much-frequented highway from the Paraguay as well as from Yucatan to Florida for peoples. In this connection von den Steinen, Ehrenreich and Im Thurn must not be neglected.

O. T. MASON.

SCIENTIFIC LITERATURE.

FOSSIL PLANTS OF THE WEALDEN.

The Wealden Flora. By A. C. SEWARD, M. A., F. G. S. Part I.—*Thallophyta-Pteridophyta*, London, 1894. Part II.—*Gymnospermæ*, London, 1895. Catalogue of the Mesozoic Plants in the Department of Geology, British Museum (Natural History). Parts I., II.

The second part of this important work has come to hand. The first part appeared in June, 1894, but as Part II. was expected even earlier than it arrived no review has appeared in America of Part I., and the whole work may now be treated together. An additional part is promised, which will embody certain critical discussions, but as no plants have been found in the English Wealden of higher rank than the Gymnosperms these two parts must contain an enumeration of the entire flora so far as known.

At the time of receiving the first part I was about starting for Europe, and while there I made some investigations in the Wealden with

a view to comparing that formation with the Potomac of the United States. I was therefore able to make excellent use of the information it contained when preparing a paper on 'Some Analogies in the Lower Cretaceous of Europe and America' for the Sixteenth Annual Report of the U. S. Geological Survey (pp. 463-542), chiefly growing out of the observations I had made. That paper is now in press, but it might have been made much more complete if I had received Part II. of this work in time to make use of it. As I have expressed in that paper my appreciation of the important information contained in Part I., and have embodied a considerable part of it in the comparisons there instituted between the Wealden flora and that of the Potomac formation, it is not necessary to go into detail relative to this portion of Mr. Seward's work. Its title sufficiently indicates its scope; thirty distinct forms are treated, the greater number of which are ferns. There are two algæ, one Chara, one hepatic and three species referred to Equisetites. Nine of the forms have more or less geographical distribution outside of England, and a table is given showing this.

It may be said of the whole work that, although constituting, as the title page indicates, the beginning of a catalogue of the Mesozoic plants in the British Museum, it is much more than a catalogue. All the material in the Museum has been carefully revised, and though treated somewhat by number it is dealt with in a systematic way, and there are many references to similar material in other museums. The literature of the subject is also fully given, and all new material is described and named. There is a large amount of this latter, the greater part of which has been collected by Mr. P. Rufford, of Hastings, for whom many species and one genus have been named. Many of the old specimens collected by Mantell and the early geologists have been thoroughly worked over and referred to modern genera, so that we now have some idea of the real nature of such objects as *Endogenites erosa*, which is shown to be a fern (*Tempskya Schimperii* Corda), while the old genera Pecopteris, Alethopteris, Lonchopteris, and most of Sphenopteris have been brought within the Mesozoic genera, Matonid-